

23969-P001US



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PATENT

In re Application of:
Brian Doege et al.

For: A METHOD FOR BACTERIALLY
TREATING SMALL-TANK TOILET
SYSTEMS AND AN APPARATUS FOR
USING SAME

Atty Dkt: 23969-P001US

Serial No: 09/723,549

Filed: November 27, 2000

Group Art Unit: 1724

Examiner: Chester T. Barry
703.306.5921

CERTIFICATE UNDER 37 C.F.R. 1.8

I hereby certify that this correspondence (along with any item referred as being enclosed herewith) is being deposited with the U.S. Postal Service as first class mail with sufficient postage in an enveloped addressed to Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on August 28, 2003.

GRACIE SOLIS

APPELLANTS' SUPPLEMENTAL BRIEF IN SUPPORT OF APPEAL

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

This brief is being submitted pursuant to 37 C.F.R. §1.193(b)(2)(ii). Appellants are furnishing herewith three (3) copies of this brief.

I. INCORPORATION BY REFERENCE

Except as reflected otherwise below, Appellants hereby incorporate herein by reference Sections I-IX of Appellants' Appeal Brief having a mailing date of 10 March 2003 ("Applicant's Appeal Brief").

II. STATUS OF THE CLAIMS

On 2 June 2003, the Examiner issued an Office Action (Paper No. 16), in which the Examiner re-opened prosecution. Applicants have herewith filed a Request for Reinstatement of Appeal under 37 C.F.R. §1.193(b)(2)(ii). Per Paper No. 16, the status of the Claims are now as follows:

Claims 3-5, 8-20, 27-28, 39 and 42-48 are pending in the Application and subject of the instant appeal.

Claims 1-2, 6-7, 21-26, 29-38, and 40-41 have been cancelled without prejudice and disclaimer.

Claims 3-5, 8-10, 14, 17-18, 39, and 42-48 stand rejected.

Claim 27 and 28 are allowed.

Claims 11-13, 15-16, and 19-20 are objected to.

III. STATUS OF AMENDMENTS

Prior to Paper No. 16, the Examiner had rejected all pending claims in the Application (Claims 3-5, 8-20, 27-28, 39 and 42-48) under 35 U.S.C. § 103(a) as specified in Paper No. 11, at 9. *See* Paper No. 13, at 1, ¶ 3 & at 2.

After reopening prosecution in Paper No. 16, Examiner (1) withdrew his prior rejections of Claims 3-5, 8-20, 27-28, 39 and 42-48; (2) rejected Claims 3-5, 8-10, 14, 17-18, 39, 42-44, and 46 on a different basis under 35 U.S.C. § 103(a); (3) rejected Claims 43-48 under 35 U.S.C. § 112, ¶ 2; (4) allowed Claims 27-28; and (5) objected to Claims 11-13, 15-16, 19-20 and indicated these would be allowed if they were rewritten so that they do not depend from rejected independent claims. Paper No. 16, at 1-7. Normally, Applicants would have amended the objected to claims so as to put them in condition for allowance during the appeal. However, Applicants have not yet been afforded the opportunity to do so at this time. MPEP § 1208.2. Applicants will have the opportunity to amend the objected to claims after Examiner's Answer. To narrow the issues on appeal, Applicants intend to do so at that time.

IV. ISSUES

(1) Are claims 3-5, 8-10, 14, 17-18, 39, 42-44, and 46 properly rejected under 35 U.S.C. § 103(a) as being unpatentable over United States Patent Application Serial No. 3,666,106, issued to Green ("*Green*"), United States Patent Application Serial No. 6,145,185, issued to Tracy *et al.* ("*Tracy*"), United States Patent Application Serial No. 4,210,528, issued to Coviello *et al.* ("*Coviello*") and United States Patent Application Serial No. 5,863,882, issued to Lin *et al.* ("*Lin*")?

(2) Are Claims 43-48 properly rejected under 35 U.S.C. § 112, ¶ 2, for failing to particularly point out and distinctly claim the subject matter for which patent protection is being sought?

V. GROUPING OF CLAIMS

Due to the new rejections of the Claims, the claims are now regrouped as follows:

Claims 5, 8-10, 14, 17-18, and 42 are a first group.

Claims 3, 4, 39, 43, 44, 45, 46, 47, and 48 are to be separately considered.

Each of this group and these claims are separately patentable for the reasons expressed below in Section VI, including as specified herein at the pages noted below:

Group one: Pages 8-12.

Claim 3: Page 13.

Claim 4: Page 13.

Claim 39: Pages 13-14.

Claim 43: Pages 14 & 16-17.

Claim 44: Pages 14 & 17-18.

Claim 45: Pages 17-18.

Claim 46: Pages 14 & 17-18.

Claim 47: Pages 17-18 & 18-19.

Claim 48: Pages 17-18 & 19.

VI. ARGUMENTA. The § 103(a) Rejections

The Examiner has rejected claims 3-5, 8-10, 14, 17-18, 39, 42-44, and 46 under 35 U.S.C. § 103(a) as being unpatentable over *Green*, *Tracy*, *Coviello*, and *Lin*. Paper No. 16, at 2-4. Appellants respectfully traverse these rejections.

1. Summary of Argument

Examiner has failed to present a *prima facie* case of obviousness. Rather than showing prior art with suggestion to create the recited combinations of each of the claims, the Examiner has resorted to hindsight to pick and choose through the prior art. The prior art does not, however, disclose, teach, or even suggest any motivation to combine certain features from the cited prior art to make the claimed combinations. To the contrary, the prior art contains disclosures that suggest there would be significant problems with such combinations and it would be counter-productive of the expressed purposes of the prior art to make such combinations. For these reasons, the Examiner's rejections should be reversed.

Furthermore, objective evidence shows the nonobviousness of the claims at issue in the present appeal. For this additional reason, the Examiner's rejections should also be reversed.

2. The Prior Art Underlying the Rejections

Green. *Green* discloses an apparatus for multi-stage treatment of waste water material. *Green*, col. 1, ll. 5-6. *Green* discloses a process in which fluid from a toilet is discharged into a first tank B in which the fluid is subjected to anaerobic bacterial action. *Id.*, col. 1, ll. 51-52. This is possible because a scum forms on the surface of the waste material in the first tank B that blocks the waste materials against exposure to air so that the anaerobic bacteria can thrive within the waste material. *Id.*, col. 3, ll. 9-13. Under these conditions, a number of intermediate and end products are formed, such as ammonia, amino acids, amides, peptones, hydrogen sulfide, indole, skatole, and mercaptans. *Id.*, col. 3, ll. 21-24. Such intermediate and end products are responsible for noxious odors, such that odors and gases must be discharged through vent conduit 62. *Id.*, col. 3, ll. 24-26.

Effluent from the first tank B is fed to a second tank (tank C) in a partially purified state where it is then subjected to aerobic bacterial action. *Id.*, col. 1, ll. 52-54. The waste is then fed

from the second tank to the third tank (tank D), which serves as a holding tank for the waste material that has been substantially purified in the first and second tanks. *Id.*, col. 1, ll. 54-58.

Green discloses that this system is designed for human conveyances, *i.e.*, for airplanes, busses, and trains. *Id.*, col. 1, ll. 26-29. The purpose of *Green*'s design is, due to size limitations in such human conveyances, to increase the holding time of the liquid and organic waste material in the first tank and to provide an improved method for rapidly and economically purifying the liquid and organic waste material. *Id.*, col. 2, ll. 5-12 & col. 4, ll. 26-29.

Green does not disclose a recirculation tank toilet system; nor does it disclose combining a surfactant with the bacteria and flushing liquid. *See* Paper No. 16, at 3.

Tracy. *Tracy* discloses a treatment system for aircraft toilet waste water. *Tracy*, col. 1, ll. 14-15. The invention relates to a waste water treatment system in which contaminants are removed from the waste water to a level sufficient to permit reuse of the purified water and discharge of the treated water to the atmosphere during flight. *Id.*, col. 1, ll. 15-20. As an option, the system can be designed such that some of the waste water is recycled for reuse in the toilet system (wherein the holding tank maintains around 3 to 5 gallons of water), and the remainder of the treated waste water is evacuated to atmosphere. *Id.*, col. 2, ll. 50-61 & col. 4, ll. 53-65.

The purpose of this process is that by discharging the treated water to atmosphere, the amount of used water that must be stored on the aircraft will be reduced, which has the benefit of being more economical (less fuel consumption due to less weight) and will reduce odor problems that would be picked up by the airplane's ventilation system, and will reduce the potential that the system would be shut down because the holding tanks are full. *Id.*, col. 1, ll. 23-48 & col. 6, l. 63 – col. 7 l. 4.

Tracy does not disclose a system in which bacteria is added to the flushing liquid; nor does it show a system in which surfactant is added to the flushing liquid.

Coviello. *Coviello* discloses a closed loop waste treatment and water recycling toilet system. *Coviello*, col. 1, ll. 13-17. This system includes the use of bacteria to treat the organic waste. *Id.*, col. 2, ll. 15-27; col. 2, l. 66- col. 3, l. 3. A purpose of *Coviello* is to solve the problems associated with the production of obnoxious odors resulting from the bacterial treatment process. *Id.*, col. 1, ll. 33-36 & col. 1, 43-45. *Coviello* provides a waste treatment and water recycling toilet system that effectively manages the system so that undesirable odors are

avoided. *Id.*, col. 1, ll. 51-55. The system includes a myriad of components, including a waste delivery system, an anoxic reactor, an aerobic digestion chamber, filtering, adsorption, and disinfection systems, and a water return system. *Id.*, col. 1, ll. 63-66.

Coviello does not disclose the use of a recirculation tank toilet system for use on a airplane, bus, or train. Moreover, like *Green*, *Coviello* does not disclose combining a surfactant with the bacteria and flushing liquid.

Lin. *Lin* discloses a cleaner and sanitizer formulation for cleaning bathroom fixtures, sinks, toilet bowls, and other surfaces. *Lin*, col. 1, ll. 7-10. The cleaner comprises a suspension of a sanitizing composition, bacterial spores, and surfactants, all contained in an aqueous solution. *Id.*, col. 1, l. 66 – col. 2, l. 1. The surfactant functions to clean and sanitize the surface. *Id.*, col. 2, ll. 20-22. The sanitizing composition sanitizes the surface and preserves the formulation from contamination by unwanted microorganisms. *Id.*, col. 2, ll. 22-24. The bacterial spores function to seed the waste collection system in order to provide a healthy dominant microbial population in the sewage collection systems, holding tanks, septic system, etc. *Id.*, col. 2, ll. 24-29.

Lin does not disclose a recirculation tank toilet system. Nor does *Lin* disclose using the cleaner and sanitizer formulation on a airplane, bus or train toilet system.

3. Examiner's Rejections

In Paper No. 16, the Examiner stated the following:

Claims 42-43, 44, 46, 3-5, 8-10, 14, 17, 18, [*sic*, and] 39 are rejected under 35 USC. § 103(a) as being unpatentable over *Green*, *Tracy*, *Lin*, and *Coviello*.

Paper No. 16, at 2.

The Examiner's argument appears to be as follows: *Green* discloses a method for treating the toilet system of an airplane, bus, or train utilizing bacteria. *Id.*, at 2-3. Because the *Green* system is not a recirculation tank toilet system (a requirement of all of the claims at issue on appeal), this deficiency is compensated for by joint reference to *Tracy* and *Coviello*. *Id.*, at 3. Moreover, because none of *Green*, *Tracy*, and *Coviello* disclose the use of surfactants with the bacteria in the flushing water (another requirement of all of the claims at issue on appeal), this further deficiency is compensated for by reference to *Lin*. *Id.*, at 4.

4. Examiner's Obviousness Rejections Is Fundamentally Flawed.

A determination of obviousness as a factual inquiry is mandated in *Graham v. John Deere Co.* MPEP § 2141 (citing *Graham v. John Deere*, 383 U.S.1 (1966)). The burden of establishing a *prima facie* showing of obviousness falls upon the Examiner. *In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir.1984). A showing of obviousness must take into account only that knowledge which was within the level of ordinary skill at the time the claimed invention was made, and cannot include knowledge gleaned only from the Applicants' disclosure. *In re McLaughlin*, 443 F.2d 1392, 1395, 170 U.S.P.Q. 209, 212 (C.C.P.A. 1971). It is the Examiner's burden to demonstrate that the Examiner is relying only on knowledge that was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Applicants' disclosure.

It is well settled that such reconstruction of the claimed invention using the Application itself as a blueprint for piecing together elements in the prior art to defeat patentability is an inappropriate process by which to determine patentability. *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457 (Fed. Cir. 1998) (citations omitted). In other words, an obvious analysis is not an invitation to "retool" the references using the Application as a blueprint to make the claimed invention. *Id.*

To ensure that Examiner is not using the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention, the Examiner must show a motivation to combine the references that create the case of obviousness. *Id.*

Thus, to establish a *prima facie* showing of obviousness, the Examiner must, *inter alia*, provide a motivation or suggestion to combine the references to make the claimed invention. MPEP § 2143.01. Three possible sources for motivation or suggestion to combine references have been identified. *Id.* (citing *In re Rouffet* 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1458 (Fed. Cir. 1998)). A motivation to combine references must be found in the nature of the problem to be solved, the teaching of the prior art, or the knowledge of persons of ordinary skill in the art. *Id.*

Teachings must be clear and particular, and broad conclusory statements regarding the teachings standing alone are not evidence. *In re Lee*, 277 F.3d 1338, 1343, 61 U.S.P.Q.2d 1430,

1433-34 (Fed. Cir. 2002); *In re Kotzab*, 217 F.3d 1365, 1370, 55 U.S.P.Q.2d 1313, 1317 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 999, 50 U.S.P.Q.2d 1614, 1616-17 (Fed. Cir. 1999) (stating that the best defense against the powerful attraction of hindsight-based obviousness analysis is the rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references). The factual question of motivation is material to patentability and cannot be resolved on subjective belief and unknown authority. *In re Lee*, 277 F.3d at 1343-44, 61 U.S.P.Q.2d at 1434.

There is no motivation to make the combination suggested by Examiner. Neither the nature of the problem to be solved nor the knowledge of persons of ordinary skill in the art would have directed such a combination. Nor does it appear the Examiner is arguing either of these two basis.

Moreover, the cited prior art (*Green*, *Tracy*, *Coviello*, and *Lin*) also fails to show any motivation to combine them as Examiner suggests. In fact, these prior art references show numerous reasons why it would be counter-productive to combine them in the manner advocated by the Examiner.

As there is no such motivation to combine them, the claims are not obvious in view of this art.

a. Group One

Claim 42 is representative of Group one.

Claim 42 states:

42. A method for treating a tank toilet system comprising the steps of:

- (a) selecting a bacteria and a surfactant;
- (b) charging the tank toilet system with flushing liquid, wherein the tank-toilet system is a recirculation tank toilet system and wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems; and
- (c) combining the bacteria, the surfactant, and the flushing liquid.

Application, Claim 42.

Like the other claims in group one, Claim 42 requires (1) a recirculation tank toilet system for (2) an airplane, bus, or train toilet system in which (3) bacteria and (4) surfactant are charged to the tank toilet system with the flushing liquid.

- i. There is no motivation to combine each of *Green*, *Tracy*, or *Coviello* with any of the others.

As noted above, and admitted by the Examiner, *Green* fails to disclose that the tank-toilet system is a recirculation tank toilet system. Contrary to Examiner's suggestion, there is simply no motivation to convert the system of *Green* to a recirculation tank toilet system.

The Examiner does not contend that *Green* offers any motivation to change it to a recirculation tank toilet system. Nor can the Examiner, because such a change is contrary to the purposes of *Green*. If *Green* were modified to be a recirculation system, this recirculation would dramatically upset the equilibrium between tanks B, C, and D. The *Green* system is premised upon the influx of clean water (through the toilet, sink, and shower) into the system, and the removal of waste material from tank D. *Green*, col. 2, ll. 74-75; col. 3, ll. 30-33; col. 3, ll. 56-57; & col. 4, ll. 9-13. Accordingly, recirculation of the flushing liquid would oppose the purpose of having the three tank system. A person of ordinary skill in the art would recognize that by recirculating the flushing liquid, the entire system would be quickly and significantly polluted and the purposes of *Green* would be thwarted.

Besides upsetting the equilibrium as noted above, by such modification, the recirculation of the flushing liquids would cause additional agitation of the liquids in each of the tanks. This would diminish the scum forming on the surface on the waste material in first tank B, which, as taught by *Green*, is striven for so as to block the waste material against exposure to the air such that the aerobic bacterial action would thrive. *Green*, col. 3, ll. 10-13. As further noted in *Green*, human conveyance systems are generally smaller than septic systems, thus, they already have lost the advantages of having a substantial length of time for the bacteria to purify the sewage. *Id.*, col. 1, ll. 20-35. Thus, the purpose of *Green* was to compensate for this lost advantage by increasing the holding time of the organic material in tank B and to accelerate the action of the bacteria. *Id.*, col. 1, 43-45. Converting to a recirculation tank toilet system would thus diminish this very benefit sought by *Green*.

By utilizing a recirculation tank toilet system, the problems with noxious fumes would also be compounded. *Green* shows that the intermediate and end products formed in tank B (including, for example, ammonia) are responsible for noxious odors, which *Green* addresses by discharging through ventilation. *Id.*, col. 3, ll. 20-26. By using a recirculation system, this would

exasperate the noxious odor problem. In a recirculation system on a human conveyance, the noxious odors are a bigger issue that cannot be handled by ventilation. It is precisely because of the confined space of such tank toilet systems on airplanes, busses, and trains, that handling the noxious odor problem becomes more critical. Thus, modification of *Green* as Examiner proposes would only serve to worsen this problem.

Furthermore, it appears the Examiner is not advocating that the requisite motivation to modify *Green* to a recirculation tank toilet systems appears in *Green*. Rather, the Examiner appears to contend such motivation may be suggested in *Tracy*. An inspection of *Tracy* reveals that no motivation is present or even suggested in this reference either.

Tracy discloses advantages of having a tank toilet system that discharges treated water during the flight. *Tracy*, col. 2, ll. 9-30; *see also id.*, col. 1, ll. 35-47. In fact, the advantageous identified by Examiner in Paper No 16 (at 3), are applicable to systems that vent the treated water to the atmosphere, regardless of whether such systems recirculate the flushing liquid. *Tracy*, col. 1, ll. 35-47. Thus, on its face, it is improper to state that the advantageous expressed in *Tracy* would suggest converting the *Green* system to a recirculation tank toilet system.

Furthermore, even if these advantageous of *Tracy* were directed to recirculation tank toilet systems (as suggested by Examiner), a review of these factors show that these would not be obtained by converting the *Green* system to a recirculation tank toilet system.

The advantages Examiner has noted in *Tracy* is that recirculation and reuse of flushing water (1) reduces the amount of water that must be stored on the aircraft; (2) reduces fuel consumption and overall cost; (3) improves airline competitiveness; and (4) reduces the risk of objectionable odors entering the passenger cabin's ventilation system. As to point (4), as noted above in the discussion of *Green*, implementing a recirculation tank toilet system with the *Green* system will raise the objectionable odors entering the passenger's cabin ventilation system. Thus, such modification to *Green* would be counter-productive to this noted advantage of *Tracy*. As to the remaining three advantages, reducing the amount to of water (point (1)) is the underlying cause for the advantageous articulated in points (2) and (3). *See Tracy*, col. 6, l. 63 – col. 7, l. 4. Of course, such advantageous are premised upon the proposition that the use of recirculation system requires only a minimum of additional components for the aircraft. *Id.*

Otherwise, any weight savings due to less water being stored on the airplane would be completely negated due to the weight and space required for the additional components.

Tracy discloses a recirculation tank toilet system that does not use a bacteria to digest the organic material. Accordingly, the advantages noted by *Tracy* do not address the problems associated with such use of bacteria. As *Coviello* shows, recirculation tank toilet systems using bacteria require a myriad of additional components to negate the noxious odor problems caused by the use of bacteria. *Coviello*, col. 1, ll. 39-66. Thus, the weight benefits that *Tracy* sought to take advantage of (by cost reduction and economic benefits), would be completely negated by the additional equipment necessitated to overcome the noxious odor problems. And, due to the size of this added equipment, such a modification to the system would likewise take up more space of the airplane. Thus, this would only serve to decrease the number of seats on the airplane, which makes the airlines less competitive, contrary to the stated goals of *Tracy*. See *Tracy*, col. 1, ll. 43-44.

As to *Coviello*, the Examiner also does not suggest this references contains any motivation to utilize a recirculation tank toilet on a airplane, bus, or train that utilizes bacteria. To the contrary, and as noted above, *Coviello* reveals that the noxious odor issue is a major factor that must be addressed when utilizing bacteria in a recirculation tank toilet system and that it is necessary to utilize much equipment to overcome this problem in such systems. *Coviello*, col. 1, ll. 39-66. In fact, the majority of *Coviello* focuses upon such difficulties that arise in recirculation systems.

Applicants note that *Coviello* issued in 1980 and that *Green* is a cited prior art reference for *Coviello*. *Coviello*, Cover. Despite this cross-reference, a long period of time has elapsed without combination of these two references. This further evidences that neither contains any suggestion to combine them with each other.

Therefore, there is no suggestion to modify any of the systems in *Green*, *Tracy*, and *Coviello* to form a recirculation tank toilet system in an airplane, bus, or train toilet system that utilized bacteria in the flushing liquid.

- ii. There is no motivation to combine *Lin* with any of *Green*, *Tracy*, or *Coviello*

As noted above, none of *Green*, *Tracy*, or *Coviello* utilizes a surfactant. Examiner attempts to overcome this deficiency by reference to *Lin*. There is no motivation to combine *Lin* with any of *Green*, *Tracy*, or *Coviello*. To suggest such motivation exists, the Examiner states the motivation to combine *Lin* and *Green* is suggested because both references are directed to septic systems. Paper No. 16, at 4. Such suggestion of motivation is wholly inadequate; motivation to combine two references is much more than they both are directed to the same broad class of prior art (here septic system art).

The Examiner further states “It would have been obvious to have added *Lin*’s bacteria/surfactant formulation to *Green*’s septic system, as modified by *Tracy*, for the purpose of enhancing degradation of organic wastes from *Green*’s toilet, as suggested by *Lin*.” Paper No. 16, at 4. There is simply no such motivation in *Lin* that adding surfactant to a system, such as *Green*’s (which already utilizes bacteria), would enhance the degradation of organic wastes in *Green*’s toilets. The surfactant is utilized in *Lin* to clean and sanitize the surface of the toilet. *Lin*, col. 2, ll. 20-24 & col. 5, ll. 42-67. *Lin*, in fact, notes the surfactants need to be selected carefully because of the toxicity that they have to the bacteria spores and because the surfactants could significantly inhibit bacteria spore stability and activity. *Lin*, col. 5, ll. 45-54. As *Green* is directed to speeding up the process by which degradation occurs (*Green*, col. 1, ll. 43-45 & col. 2, ll. 9-11), *Lin* teaches that the addition of surfactant to a system already using bacteria is counter-productive to the degradation of organic wastes. *Lin*, col. 5, ll. 45-54.

Moreover, there is no disclosure in *Green*, *Tracy*, *Coviello*, or *Lin* the surfactant utilized in combination with bacteria would overcome the problems of using bacterial based products in transportation recirculation tank toilet systems; this result was unexpected. Application, at 5-6; First Declaration, ¶ 5.

Thus, there is no motivation to combine the disclosure of *Lin* with one or more of *Green*, *Tracy*, and *Coviello* so as to make the combination of Claim 42 and the other claims in group one.

Thus, Examiner has failed his *prima facie* case of obviousness for Claim 42 and the other claims of group one.

b. Claim 3

Similar to Claim 42 and the other claims in group one, Claim 3 requires a recirculation tank toilet system for an airplane, bus, or train toilet system in which bacteria and surfactant are combined with the flushing liquid. Thus, for the same reasons above for the claims of group one, Examiner has not made a *prima facie* case of obviousness.

Furthermore, Claim 3 further has the additional limitation that the bacteria is combined with the surfactant in a weight ratio (weight of the bacteria:weight of the surfactant) from about 10% to about 50%. The Examiner states that the weight ratio of bacteria to surfactant is a “known result effective parameter,” the optimization of which would have been obvious. Paper No. 16, at 4. As the results of adding the surfactant was unexpected (*i.e.*, to overcome the problems of using bacterial based products in transportation recirculation tank toilet systems), the result of adding the surfactant was, by definition, unknown. Application, at 5-6; First Declaration, ¶ 5. Thus, the recited ratio of Claim 3 could not be a known result effective parameter, as suggested by Examiner.

Thus, for this additional reason, Examiner has failed his *prima facie* case of obviousness for Claim 3.

c. Claim 4

Claim 4 depends from Claim 3; thus for the same reasons as stated above for Claim 3, Examiner has not made a *prima facie* case of obviousness.

Furthermore, Claim 4 further has the additional limitation that the bacteria is combined with the surfactant in a weight ratio (weight of the bacteria:weight of the surfactant) from about 10% to about 30%. Again and as noted for Claim 3 above, contrary to Examiner’s suggestions, this recited ratio of Claim 4 is not and could not be a “known result effective parameter” the optimization of which would have been obvious.

Thus, for this additional reason, Examiner has failed his *prima facie* case of obviousness for Claim 4.

d. Claim 39

Similar to Claim 42 and the other claims in group one, Claim 39 requires a recirculation tank toilet system for an airplane, bus, or train toilet system in which bacteria and surfactant are

combined with the flushing liquid. Thus, for the same reasons above for the claims of group one, Examiner has not made a *prima facie* case of obviousness.

Furthermore, Claim 39 further has the additional limitation that the bacteria and surfactant are combined with the flushing liquid in an amount capable of neutralizing the byproduct odor. As further reflected in Claim 39, the byproduct is formed by the bacterial decomposition of the human waste product in the tank toilet system. Again, the Examiner suggests that this amount of the bacteria and surfactant in the flushing liquid is a “known result effective parameter,” the optimization of which would have been obvious. Paper No. 16, at 4. Once again and as noted for Claim 3 above, contrary to Examiner’s suggestions, the claimed amount is not and could not be a “known result effective parameter” the optimization of which would have been obvious.

Thus, for this additional reason, Examiner has failed his *prima facie* case of obviousness for Claim 39.

e. Claims 43, 44, and 46

Applicant has not included these claims in group one because of the § 112, ¶ 2 rejections discussed *infra*. However, with respect to the obviousness rejection, the arguments pertaining to non-obvious are the same as those articulated above for group one.

Claim 43 depends from Claim 42.

Moreover, similar to Claim 42 and the other claims in group one, Claim 44 requires a recirculation tank toilet system for an airplane, bus, or train toilet system in which bacteria and surfactant are charged to the tank toilet system the flushing liquid.

Claim 46 depends from Claim 44.

Thus, for the same reasons above for the claims of group one, Examiner has not made a *prima facie* case of obviousness of each of Claims 43, 44, and 46.

5. The Objective Evidence of Nonobviousness Shows The Claimed Invention Is Not Obvious

The above shows that a *prima facie* case of obviousness has not been presented in view of the above references; moreover, objective evidence of nonobviousness further supports Appellants’ assertion of nonobviousness. Appellants have submitted several declarations of Brian Doege showing, *inter alia*, Appellants’ invention has enjoyed commercial success, has

obtained unexpected results, has been professionally approved after initial skepticism by experts, has been copied by others, and has become an industry standard. Declaration of Brian Doege Under 37 C.F.R. § 1.132, dated August 2, 2002 (the “First 132 Declaration”), ¶¶ 1-11, 13-20; Second Declaration of Brian Doege Under 37 C.F.R. §§ 1.131 & 1.132, dated November 20, 2002 (“Second 132 Declaration”), ¶¶ 14 & 18-19; Third Declaration of Brian Doege Under 37 C.F.R. § 1.132, dated March 10, 2003 (the “Third 132 Declaration”), ¶¶ 2-11.

A detailed discussion of this objective evidence of nonobvious was presented in Applicants’ Appeal Brief, at 10-16, which is incorporated herein. The Appellants respectfully assert that this objective evidence substantiates the nonobviousness of Appellants’ invention.

In its detailed discussion of the objective evidence, Applicants showed that Examiner failed to contradict or dispute this objective evidence. Applicants’ Appeal Brief, at 12-16. In Paper No. 16, Examiner again failed to contradict or dispute this evidence. In fact, Examiner did not address Applicants’ objective evidence at all, notwithstanding the fact that Examiner’s only prior art rejections in Paper No. 16 were based upon obviousness. Examiner’s failure to challenge Applicants’ objective evidence further confirms that Applicants’ evidence has a strong nexus with the claimed invention and that this objective evidence greatly demonstrates nonobviousness of the claims.

In sum, Applicants’ objective evidence “serve[s] as insurance against the insidious attraction of the siren hindsight” when evaluating the prior art, which is particular pertinent here in view of the hindsight that is being utilized to pick and choose through four prior art references to assert obviousness. *W. L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983). Thus, given the vast objective evidence that supports nonobviousness of the present invention, the Appellants respectfully assert this evidence substantiates the nonobviousness of Appellants’ invention.

A. The § 112, ¶ 2 Rejections

The Examiner has rejected Claims 43-48 under 35 U.S.C. § 112, ¶ 2 for failing to particularly point out and distinctly claim the subject matter for which patent protection is sought. Appellants respectfully traverse these rejections.

1. Summary of Argument

The scope of each of Claims 43-48 are clear and the public has been informed of the boundaries of the claims. MPEP § 2173. The definiteness of a term must not be analyzed in a vacuum as suggested by Examiner, but rather must be analyzed in light of (a) the content of the Application; (b) the teachings of the prior art; and (c) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. MPEP § 2173.02. Under such analysis, the claims rejected under 35 U.S.C. § 112, ¶ 2 are set forth and circumscribed with a reasonable degree of clarity and particularity, and are thus not indefinite.

2. Claim 43

Examiner has rejected Claim 43 due to a purported ambiguity that Examiner contends arises in the simultaneous use of the modifiers “at most” and “about” in connection with the volume of the tank. Paper No. 16, at 4-5.

As an initial matter, there is nothing *per se* improper for the use of the term “about” in the claim language. See MPEP § 2173; *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 316 (Fed. Cir. 1983). Federal Circuit precedent illustrates the fact-dependency of determinations of the technologic scope of “about” and similar terms, depending on their contexts and the precision or significance of the measurements used. *Modine Manufacturing Co. v. United States Int’l Trade Comm’n*, 75 F.3d 1545, 1554, 37 U.S.P.Q.2d 1609, 1615 (Fed. Cir. 1996); see also *Hybritech, Inc. v. Abbott Labs.*, 849 F.2d 1446, 1455, 7 U.S.P.Q. 1191, 1199 (Fed. Cir. 1988) (“at least about 10⁸ liters/mole” is literally satisfied by 4.8 x 10⁷ liters/mole and 7.1 to 7.5 x 10⁷ liters/mole).

In this case, the term “about” is utilized in the context of an upper boundary to the capacity of the tank toilet system, namely, “at most about 120 gallons.” In such context, a person of ordinary skill in this art would not be concerned with precisions of measurement of the tank capacity to fractional gallons. Accordingly, it would be immediately recognized by a person of ordinary skill in the art that a tank having a capacity of 120.2 gallons has capacity of “at most about 120 gallons” (*i.e.*, it would meet the limitation of Claim 43).

As to Examiner’s complaint respecting the simultaneous use of the term “at most” in conjunction with the term “about,” this occurs simply because Claim 43 adds a limitation

directed to the upper boundary of the capacity of the tank volume. Often when the term “about” is used, it is being utilized in conjunction with an upper or lower boundary. Thus, there is nothing remarkable about Applicant using “at most” in conjunction with “about.” Applicants further note that it has recently searched the electronically searchable patents on the USPTO’s database (for patents published on or after 1976). In a first search conducted for the phrase “at most about” appearing in the claims of the patents in this database, this search yielded over a thousand issued patents containing such claim language. Moreover, in a similar search for the phrase “at least about” appearing in the claims of the patents in the database, this search revealed over fifty-five thousand issued patents containing that phrase in the claims, including, notably, twelve patents to which the present Examiner is listed as the primary examiner. *See, e.g.,* United States Patent Serial Nos. 6,555,003 (Claim 1: “at least about 70% of the wastewater”), 6,231,766 (Claim 1: “at least about 60 feet per minute”), and 6,413,423 (Claim 8: “at least about 40 psi” and “at least about 6 ppm”). Accordingly, there is no ambiguity raised by using the term “at most” and “about” simultaneously.

3. Claim 44-48

The Examiner has rejected independent Claim 44 and its dependent Claims 45-48 because he contends the element (d) of Claim 44 --“monitoring the tank system to determine the flushing liquid should be removed”-- is ambiguous. Paper No. 16, at 5.

As an initial point, there is no ambiguity in this claim language in that this language sets forth and circumscribes with a reasonable degree of clarity and particularity the step to be performed. The questions raised by Examiner (D1-D9) are simply not pertinent to whether the claims are definite. This is particularly evident when element (d) of Claim 44 is reviewed in context with the other elements of Claim 44.

Furthermore, in the discussion of Figure 3A, the Application discusses this step:

In step 307, the small-tank toilet is put into operation, and in step 308 it is monitored. Such monitoring includes inspecting the levels of the fluids in the system to make sure it does not overflow the tank. Such monitoring may also be performed on a time basis, a per trip basis, or some other mechanism.

In step 309, the determination is made whether the flushing fluids need to be recharged. If not, the monitoring step 308 continues. If so, in step 310, the determination is made whether the same or different bacteria/surfactant composition is to be utilized.

Application, at 14 & Figures 3A-3C. In view of this disclosure, there is further no ambiguity in this element.

Thus, the content of the Application and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made, confirm this element of Claim 44 (and its dependent claims) is not indefinite.

4. Claim 46

The Examiner has rejected Claim 46 because he contends it is unclear how or in what respect a “monitoring step” can be a “time basis.” Paper No. 16, at 5-6. Again, the Application makes it clear to a person of ordinary skill in the art of the Application that the monitoring step is a time basis, *i.e.*, monitoring the amount of time after the flushing liquid was charged to the tank toilet system (element (b) of Claim 44 from which Claim 46 depends). And, after the time basis has transpired (such as after three days), this monitoring step has determined that the flushing liquids should be removed.

The above recited language from the Application (in the discussion of Claim 44) further shows a person of ordinary skill would understand that the monitoring step can be performed on a time basis. Application, at 14 and Figures 3A-3C. Examples 2 and 4 reflect testing that was performed wherein the monitoring step is performed on a time basis. Application, at 16-18.

Again, the content of the Application and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made, confirm this element of Claim 46 is not indefinite.

5. Claim 47

The Examiner has rejected Claim 47 because he contends it is unclear what is meant that the “monitoring step” is “at most three days” Paper No. 16, at 6. Applicant notes that the element of Claim 47 states that the “time basis is at most three days. Based upon the same reasons discussed above for Claim 46, a person of ordinary skill in the art of the Application would understand that the monitoring step is to be performed on a time basis and this time basis is three days or less. Thus, for example, if the tank toilet system were monitor such that every two days the flushing liquid were removed and a new flushing liquid was then charged to the tank toilet system, this would be a time basis that falls within the element of dependant Claim 47.

Despite his rejection of Claim 47, the Examiner appeared to understand this meaning, as reflected in his statements of page 7 of Paper No. 16.

Again, the content of the Application and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made, confirm this element of Claim 47 is not indefinite.

6. Claim 48

The Examiner has rejected Claim 48 because he contends it is unclear what is meant that the “monitoring step” is a “trip basis.” Paper No. 16, at 6. Again, the Application makes it clear to a person of ordinary skill in the art of the Application that the monitoring step is a trip basis, *i.e.*, monitoring the number of trips after the flushing liquid was charged to the tank toilet system (element (b) of Claim 44 from which Claim 46 depends). And, after the requisite number of trips has occurred, the monitoring step has determined that the flushing liquids should be removed.

Since the Claim 48 depends from Claim 44, which requires the tank toilet system to be selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems, the term “trip” is readily understood by a person of ordinary skill in the art of the Application in this context. The above recited language from the Application (in the discussion of Claim 44) further shows a person of ordinary skill would understand that the monitoring step can be performed on a trip basis. Application, at 14 and Figures 3A-3C.

Again, the content of the Application and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made, confirm this element of Claim 46 is not indefinite.

As all of the elements of each of Claims 43-48 are set forth and circumscribed with a reasonable degree of clarity and particularity; thus none of these claims contains an element that is indefinite.

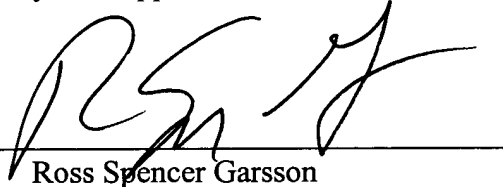
VII. CONCLUSION

For the reasons noted above, the rejection of claims 3-5, 8-10, 14, 17-18, 39 and 42-48 is in error. Reversal of the rejections and allowance of the Application is respectfully requested.

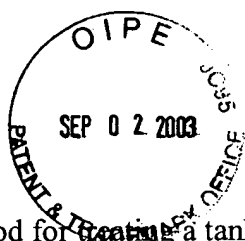
Respectfully submitted,

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APPENDIX

3. A method for treating a tank toilet system comprising the steps of:
- (a) selecting a bacteria and a surfactant;
 - (b) charging the tank toilet system with flushing liquid, wherein the tank toilet system is a recirculation tank toilet system and wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems;
 - (c) combining the bacteria, the surfactant, and the flushing liquid, wherein the bacteria is selected from the group consisting of *Bacillus licheniformis*, *Pseudomonas fluorescens*, *Alcaligenes latus*, *Bacillus subtilis*, and *Pseudomonas putida* and wherein the weight ratio of the bacteria and the surfactant (weight of the bacteria:weight of the surfactant) charged to the tank toilet system is from about 10% to about 50%.
4. The method of claim 3 wherein the weight ratio (weight of the bacteria:weight of the surfactant) is from about 10% to about 30%.
5. A method for treating a tank toilet system comprising the steps of:
- (a) selecting a bacteria and a surfactant;
 - (b) charging the tank toilet system with flushing liquid; and
 - (c) combining the bacteria, the surfactant, and the flushing liquid, wherein the bacteria is selected from the group consisting of *Bacillus licheniformis*, *Pseudomonas fluorescens*, *Alcaligenes latus*, *Bacillus subtilis*, and *Pseudomonas putida* and wherein the tank toilet system,
 - (i) is a recirculation tank toilet system, and
 - (ii) is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems.
8. A method for treating a tank toilet system comprising the steps of:
- (a) selecting a bacteria and a surfactant;
 - (b) charging the tank toilet system with flushing liquid, wherein the tank toilet system is a recirculation tank toilet system and wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems;

(c) combining the bacteria, the surfactant, and the flushing liquid; and
(d) mixing the bacteria and surfactant into a composition before combining it with the flushing liquid, wherein said composition is a form selected from the group consisting of a liquid form, a powder form, and a solid block-tablet form.

9. The method of claim 8 further comprising the steps of:

- (a) mixing a filler in the composition; and
- (b) mixing a food source in the composition.

10. The method of claim 9 further comprising the steps of:

- (a) mixing a deodorant in the composition; and
- (b) mixing a coloring agent in the composition, wherein the filler is selected from the group consisting of calcium carbonate and sodium sulfate and the food source is dried brewers yeast.

11. The method of claim 9 wherein:

- (a) the filler is mixed in the composition at least about 50% by weight;
- (b) the food source is mixed in a range from about 0.1% to about 5% by weight;
- (c) a deodorant is mixed in the composition in a range from about 0.05% to about 2% by weight; and
- (d) the bacteria and the surfactant are mixed in the composition in the range from about 5% to about 50% by weight.

12. The method of claim 9 wherein:

- (a) the filler is mixed in the composition with the range from about 50% to about 80% by weight;
- (b) the food source is dried brewers yeast in the composition in the range from about 1% to about 2% by weight;
- (c) a deodorant is mixed in the composition in a range from about 0.2% to about 1% by weight; and

(d) the bacteria and the surfactant are mixed in the composition in the range of about 15% to about 20% by weight.

13. The method of claim 12 further comprising the step of combining a coloring agent with the bacteria and the surfactant, wherein the coloring agent is compatible with bacteria.

14. The method of claim 8 further comprising the steps of:

- (a) mixing water in the composition;
- (b) mixing an alcohol in the composition; and
- (c) wherein the form of the composition is the liquid form.

15. The method of claim 14 wherein:

- (a) the water is mixed in the composition at least about 50% by weight;
- (b) the alcohol is mixed with a monoethanolamine, the bacteria, and the surfactant in the range from about 1.5% to about 60% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant;
- (c) the monoethanolamine is mixed with the alcohol, the bacteria, and the surfactant in the range from about 1.5% to about 60% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant; and
- (d) the bacteria and the surfactant are mixed with the alcohol and monoethanolamine in the range from about 20% to about 97% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant.

16. The method of claim 15 wherein:

- (a) the alcohol is mixed with a monoethanolamine, the bacteria, and the surfactant in the range from about 5% to about 20% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant;

(b) the monoethanolamine is mixed with the alcohol, the bacteria, and the surfactant in the range from about 5% to about 15% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant; and

(c) the bacteria and the surfactant are mixed with the alcohol and monoethanolamine in the range from about 65% to about 90% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant.

17. The method of claim 9 further comprising the step of combining a binding agent with the bacteria and the surfactant.

18. A method for treating a tank toilet system comprising the steps of:

(a) removing a first flushing liquid from a tank toilet system, wherein the tank toilet system is a recirculation tank toilet system and wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems;

(b) charging the tank toilet system with a second flushing liquid;

(c) selecting a bacteria, which bacteria is selected from the group consisting of *Bacillus licheniformis*, *Pseudomonas fluorescens*, *Alcaligenes latus*, *Bacillus subtilis*, and *Pseudomonas putida*;

(d) selecting a surfactant for combining with the bacteria;

(e) charging the tank toilet system with the bacteria and the surfactant;

(f) repeating steps (a)-(e).

19. The method of claim 18 further comprising the steps of:

(a) combining a filler and a food source with the bacteria and the surfactant, wherein

(i) the filler is calcium carbonate and is combined with the food source, the bacteria, and the surfactant in an amount of at least about 50% by weight;

(ii) the food source is dried brewers and is combined with the filler, the bacteria, and the surfactant in a range from about 0.1% to about 5% by weight; and

(iii) the bacteria and the surfactant with the filler and the food source in a range from about 5% to about 50% by weight.

20. The method of claim 18 further comprising the steps of:

(a) combining water, alcohol, and monoethanolamine, with the bacteria and the surfactant, wherein

(i) water is combined with the alcohol, the monoethanolamine, the bacteria, and the surfactant, by at least about 50% by weight;

(ii) the alcohol is combined with the monoethanolamine, the bacteria, and the surfactant in the range from about 1.5% to about 60% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant;

(iii) the monoethanolamine is combined with the alcohol, the bacteria, and the surfactant in the range from about 1.5% to about 60% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant; and

(iv) the bacteria and the surfactant are combined with the alcohol and monoethanolamine in the range from about 20% to about 97% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant.

27. An apparatus for treating human waste products comprising:

(a) a tank toilet system;

(b) a flushing liquid charged into the tank toilet system, wherein the tank toilet system is a recirculation tank toilet system and wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems;

(c) a bacteria and a surfactant combined with the flushing liquid; and

(d) a filler and a food source combined with the bacteria and the surfactant, wherein

(i) the filler is calcium carbonate and is combined with the food source, the bacteria, and the surfactant in an amount of at least about 50% by weight;

(ii) the food source is dried brewers yeast and is combined with the filler, the bacteria, and the surfactant in a range from about 0.1% to about 5% by weight; and

(iii) the bacteria and the surfactant with the filler and the food source in a range from about 5% to about 50% by weight.

28. An apparatus for treating human waste products comprising:

(a) a tank toilet system;

(b) a flushing liquid charged into the tank toilet system, wherein the tank toilet system is a recirculation tank toilet system and wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems;

(c) a bacteria and a surfactant combined with the flushing liquid; and

(d) water, alcohol, and monoethanolamine, combined with the bacteria and the surfactant, wherein

(i) water is combined with the alcohol, the monoethanolamine, the bacteria, and the surfactant, by at least about 50% by weight;

(ii) the alcohol is combined with the monoethanolamine, the bacteria, and the surfactant in the range from about 1.5% to about 60% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant;

(iii) the monoethanolamine is combined with the alcohol, the bacteria, and the surfactant in the range from about 1.5% to about 60% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant; and

(iv) the bacteria and the surfactant are combined with the alcohol and monoethanolamine in the range from about 20% to about 97% by weight of the alcohol, the monoethanolamine, bacteria, and surfactant.

39. An apparatus for treating human waste products comprising:

(a) a tank toilet system, wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems; and

(b) a flushing liquid charged into the tank toilet system, wherein the tank toilet system is a recirculation tank toilet system;

(c) a bacteria charged into the tank toilet system for decomposing human waste product in the tank toilet system to form byproduct; and

(d) a surfactant charged into the tank toilet system, wherein the bacteria and surfactant are combined with the flushing liquid in an amount capable of neutralizing the byproduct odor.

42. A method for treating a tank toilet system comprising the steps of:
- (a) selecting a bacteria and a surfactant;
 - (b) charging the tank toilet system with flushing liquid, wherein the tank-toilet system is a recirculation tank toilet system and wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems; and
 - (c) combining the bacteria, the surfactant, and the flushing liquid.
43. The method of claim 42 wherein the tank toilet system has a capacity at most about 120 gallons.
44. A method for treating a tank toilet system comprising the steps of:
- (a) selecting a bacteria and a surfactant;
 - (b) charging the tank toilet system with a flushing liquid, wherein the tank toilet system is a recirculation tank toilet system, wherein the tank toilet system is selected from the group consisting of airplane toilet systems, bus toilet systems, and train toilet systems;
 - (c) combining the bacteria and the surfactant with the flushing liquid;
 - (d) monitoring the tank system to determine the flushing liquid should be removed;
 - (e) removing the flushing liquid in response to the determining step; and
 - (f) repeating steps (a)-(e).
45. The method of claim 44 wherein the monitoring step comprises inspecting level of liquid in the tank toilet system.
46. The method of claim 44 wherein the monitoring step is a time basis.
47. The method of claim 46 wherein the time basis is at most three days.
48. The method of claim 44 wherein the monitoring step is a trip basis.